MIL-C-23020B(SHIPS)
12 April 1965

SUPERSEDING
MIL-C-23020A(SHIPS)
10 July 1962
(See 6.3)

MILITARY SPECIFICATION

CABLE, COAXIAL (FOR SUBMARINE USE)

1. SCOPE

1.1 This specification covers the specific requirements for coaxial cables intended for submarine applications.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL
- L-P-390 - Plastic Molding Material, Polyethylene, Low and Medium Density.

MILITARY
- MIL-C-17 - Cables, Radio Frequency; Coaxial, Dual Coaxial, Twin Conductor and Twin Lead.
- MIL-C-915 - Cable, Cord and Wire, Electrical (Shipboard Use).

DRAWINGS

BUREAU OF SHIPS
- REB49366 - MX-2327/U - Stuffing Tube for Use with RG-14A/U Cable.
- REB49336 - MX-2326/U - Stuffing Tube for Use with RG-17/U Cable.
- REB49397 - MX-2646/U - Stuffing Tube for Use with RG-57/U Cable.

UNDERWATER SOUND LABORATORY
- 44500-8-69 - Stuffing Tube.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

ASSOCIATION OF AMERICAN RAILROADS
American Association of Railroad Rules

(Application for copies should be addressed to the Association of American Railroads, 59 East Van Buren Street, Chicago 5, Illinois.)

FSC 6145

3. REQUIREMENTS

3.1 Preproduction sample.- Prior to beginning production, a sample shall be tested as specified in 4.2. The sample shall be from production tools, and shall be a minimum of 250 feet long.

3.2 General requirements.- The requirements of MIL-C-17 apply as requirements of this specification with the exceptions and additions specified herein. When the two specifications conflict, the requirements of this specification shall govern.

3.3 Design and construction.- The design, construction, and physical dimensions shall be as specified in the specification sheets.

3.4 Materials.- The cable shall be constructed of material as specified in the specification sheet. When a specific material is not specified, it shall be of a type and quality to assure physical and electrical compatibility with the requirements of this specification. Approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product. Materials shall be new, that is manufactured within 6 months prior to purchase.

3.4.1 Waterproofing compounds.- The cables procured in accordance with this specification shall be watertight along the axis of the cable to the extent specified. In order to meet this requirement, a water sealant, compound, or paste may be used as a filler provided the cables so constructed meet all other requirements. The waterproofing procedure shall be such that the individual wires of the outer conductor (Braid) are readily separable from the jacket, filler, and core, and the construction shall be such as to maintain ease of attachment to standard connectors without significant degradation of electrical characteristics as compared with similar assemblies using standard cables.

3.5 Dielectric.- The dielectric shall make mechanically intimate contact with the inner conductor (or conductors) so that no air film, air bubbles, or air voids are present. There shall be no marks or imperfections on the core which would prevent proper sealing with an O-ring. Unless otherwise specified (see 6.1), the inner conductor shall not be off-center more than 10 percent of the core radius.

3.6 Jacket thickness.- The minimum jacket thickness shall be as specified in the specification sheet.

3.7 Abrasion.- When tested as specified in 4.4.3, the cable shall withstand the number of revolutions specified in the specification sheet prior to cut-through.

3.8 Watertightness.- When tested as specified in 4.4.2, the leakage in a 2-hour period shall not exceed the value specified in the specification sheet.

3.9 Dimensions.- The manufacturer of cables to this specification shall provide the necessary equipment to monitor continually the physical dimensions of the cable core and overall diameter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commerical laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Preproduction inspection.- Preproduction inspection shall consist of the tests of MIL-C-17 with the exceptions and additions specified in 4.4.

4.3 Quality conformance inspection.- Quality conformance inspection shall be in accordance with acceptance inspection of MIL-C-17.

4.3.1 Unit of product.- For purposes of this specification, a unit of product shall be defined as 1000 feet cable having the sample type designation.

4.4 Test procedures.-

4.4.1 Cold working.- A 20-foot sample from each reel shall be conditioned for not less than 20 hours at -54° + 0-5°C. Immediately thereafter but while the specimen is still in the cold chamber at the conditioning temperature, the specimen shall be drawn at a rate of not less than 100 feet per minute over a roller having a diameter of 12 inches, in such a manner that a "U" bend of 180 degrees is imposed progressively on the entire length. The specimen shall then be drawn in the reverse direction at the same rate. It shall be drawn alternately forward and backward, for a total of four times in each direction. The specimen shall then be removed from the cold chamber and visually examined for evidence of cracks or flaws in the dielectric material or jacket. A length of the cable employed in the cold working test shall then meet the requirements of 3.8.

4.4.2 Hydrostatic test.- The hydrostatic test shall be conducted in accordance with MIL-C-915, except that under the water-tightness test procedure specified in MIL-C-915, the methods of sealing and clamping the cable jacket shall be in accordance with the methods employed in the pressure proof fittings designated herein for the individual types. When the applicable fitting employs an "O" ring to seal around the cable core, the "O" ring shall not be installed during the hydrostatic test. The test shall be made at the pressure and rate of leakage specified on the specification sheet for a period of 2 hours. If the cable fails the hydrostatic test it shall be rejected. The sampling for this test shall be a 5-foot piece of each meanufacturer's length. Retesting will be permitted only when, in the judgment of the Government representative, the previous test was improperly conducted.

4.4.2.1 Fittings.- Fittings for the hydrostatic test shall be in accordance with the drawings listed in section 2 and as specified on the specification sheets.

4.4.3 Abrasion.- The abrasion test shall be in accordance with MIL-C-915.

4.5 Visual and mechanical examination.- The diameters and out-of-roundness of the core and jacket shall be monitored on a continuous production basis by a suitable technique which will provide the diameter in two mutually perpendicular planes at any cross section. The dimensions shall be as specified and out-of-roundness (the difference in diameter dimension is mutually perpendicular planes at any cross section) shall not exceed 50 percent of the difference between the maximum and minimum diameters specified. The results shall be permanently recorded by a two-pen strip chart recorder, and shall be furnished to the procuring activity under separate cover at the time of cable shipment. Each recording shall be identified as to the reel of cable to which it applies, and each recording shall be identified to within ±2 feet of the corresponding point on the cable being measured. The dimensional recordings shall be individually identified as to:

(a) Contract.
(b) Cable type.
(c) Manufacturer.
(d) Footage of corresponding cable.
(e) Whether applicable to dielectric or jacket measurements.
(f) Calibration.

4.5.1 The technique used (including detector, recorder, and associated units) shall meet the following:

(a) Have a sensitivity to record accurately the cable diameter to the third decimal place (0.001 inch) along the length of cable.
(b) Have a response capable of accurately recording changes in diameter as specified in (a) at the speed (feet/minute) of cable production. Deviation occuring on a length 0.060 inch or greater shall be discernible.
(c) The strip chart recorder pen traverse shall be large enough to distinguish easily changes in diameter of 0.001 inch.

The ratio of cable production in feet/minute to chart travel in inches/minute shall be small enough to permit ease in comparing the individual traces from the two pens. A 20:1 ratio shall be considered maximum acceptable ratio.

4.6 Inspection of preparation for delivery.- The cable shall be inspected to determine conformance with section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early use.-

5.1.1 Packaging.- The cable shall be shipped on reels. The diameter of the drum shall be large enough to prevent damage to the cable from reeling or unreeling. The spools or reels shall be substantial and so constructed as to prevent damage to the cable during shipment and handling. The ends of the cables shall be sealed with waterproof pressure-sensitive tape applied over the ends, and back from the ends approximately 4 inches.

5.1.2 Packing.- Packing of spools or reels shall be accomplished in a manner which will insure acceptance by common carrier and will afford protection against physical and mechanical damage during direct shipment from the supply source to the using activity for early use. The method of packing or loading shall conform to the American Association of Railroad Rules or other carrier regulations as applicable to the mode of transportation.

5.1.3 Marking.- Shipment marking information shall be provided on both flanges of each reel in accordance with the contractor's commercial practice. The information shall include the following:

(a) Cable description.
(b) Federal Stock Number.
(c) Number and size of conductors.
(d) Quantity. (Footage of all lengths)
(e) Contract or order number.
(f) Contractor's name or manufacturer's code.
(g) Year of manufacture.

Where paper labels are used containing the shipment marking information, labels shall be protected by transparent compound to prevent deterioration of the markings.

5.2 Domestic shipment and storage or overseas shipment.- The requirements and levels of preservation and packaging, packing, and marking for shipment shall be specified by the procuring activity (see 6.1).

(5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment which may be required when procurement is made.

5.2.1.1 Preservation and packaging, packing, and marking.- Cable shall be preserved and packaged level A or C, and packed level A, B, or C and marked as specified (see 6.1) in accordance with MIL-C-12000. The diameter of the spool or reel core or coil shall be not less than 20 times the diameter of the cable. Cable shall be furnished on returnable or nonreturnable reels. The number of cable lengths shall be kept to a minimum consistent with good manufacturing practice.)

6. NOTES

6.1 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Cable type required (see specification sheets).
(c) Preservation and packaging, packing and marking instructions if other than as specified in 5.1 (see 5.2).

6.2 Preproduction.- Invitations for bids should provide that the Government reserves the right to waive the requirement for preproduction samples as to those bidders offering a product which has previously been procured or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending procurement.

6.3 CHANGES FROM PREVIOUS ISSUE.- THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "#" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

Preparing activity:
Navy - SH
(Project 6145-N140Sh)